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WATERTOWN ARSENAL LABORATORY

MEMORANDUM REPORT

NO. WAL 710/740

Analysis of Caliber .45 M1911 Pistol Ball Ammunition

Submitted by Aberdeen Proving Ground, Md.

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BY
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MEMORANDUM REPORT NO. WAL 710/740

Final Report on Job 129

UNANNOUNCED

27 April 1945

Analysis of Caliber .45 M1911 Pistol Ball Ammunition

Submitted by Aberdeen Proving Ground, Md.

ABSTRACT

Chemical analysis of the lead cores and hardness and thickness measurements of the jacket components and lead cores of five caliber .45 M1911 pistol ball projectiles indicate that four of the projectiles are similar. The lead core of one projectile is more highly alloyed and consequently harder than the others. Slightly lower ballistic limits against helmet and body armor steel are expected from bullets similar to the harder one.

1. In accordance with instructions from the Office, Chief of Ordnance¹, five rounds of caliber .45 M1911 pistol ball ammunition were sent to this arsenal from Aberdeen Proving Ground, Md. for chemical analysis of the lead cores and hardness surveys of the lead cores, steel jackets, and copper cladding.

2. Although no information was available, it is presumed that the subject rounds of caliber .45 ball ammunition represent the projectiles used at Aberdeen Proving Ground, Md. for the ballistic acceptance testing of Hadfield steel sheet submitted for test in accordance with Specifications AXS-1170 and AXS-1346. Copper clad steel jacketed ammunition has been previously recommended² for the ballistic testing of helmet and body armor steel.

1. O.C. 471.42/2367 - wtn 471.2/590, 10 February 1945.

2. WAL 710/635 and WAL 710/351.

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3. Knoop hardness surveys and thickness measurements were made upon sectioned and polished surfaces prepared as described in paragraph 7 of Watertown Arsenal Laboratory Memorandum Report No. WAL 710/351, entitled "Comparison of the Physical, Chemical, and Ballistic Properties of Various Lots of Caliber .45 M1911 Pistol Ball Ammunition Used for the Proof Testing of Helmets and Body Armor Components".

4. Table I contains the results of the chemical analyses of the lead cores, and the hardnesses and thicknesses of the various components. The hardness and thickness values are the average of at least three measurements. Round #4 appears to be significantly different from the other 4 projectiles, having higher antimony and tin contents in the lead core and a consequently higher core hardness. From the results of the ballistic tests reported in WAL 710/351, it may be estimated that projectiles similar to round #4 will develop ballistic limits against 0.045" thick Hadfield steel possibly 20 ft./sec. lower than will projectiles similar to the other four rounds due to the higher core hardness. The hardnesses and dimensions of the jacket components of the five rounds show no significant differences among the projectiles.

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TABLE I

Physical and Chemical Characteristics of Caliber .45 Ball Ammunition

		Round #1	Round #2	Round #3	Round #4	Round #5
		2.28	2.22	2.25	2.64	2.35
Chemical Analysis of Lead Core	Antimony					
	Arsenic	.007	.007	.014	.016	.010
	Tin	.21	.17	.21	.55	.10
	Lead	Remainder	Remainder	Remainder	Remainder	Remainder
Knoop Hardness of Components	Lead Core	8.3	8.1	7.9	9.5	7.5
	Outer Copper Cladding	134	145	168	131	164
	Steel Jacket	253	246	253	217	228
	Inner Copper Cladding	188	134	184	164	145
Thickness of Jacket Components Inches	Outer Copper Cladding	.003	.003	.003	.003	.003
	Steel Jacket	.017	.017	.015	.015	.015
	Inner Copper Cladding	.009	.007	.006	.005	.005

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